IN THE CLAIMS

1. (Currently amended) Apparatus ~~(40; 60; 80; 90)~~ for processing an input signal ~~(S.sub.RF (t))~~ having a carrier frequency ~~(.omega..sub.RF)~~ that defines a desired band and at least a side band having a side band frequency ~~(n.omega..sub.LO)~~ that is higher than the carrier frequency ~~(.omega..sub.RF)~~, the apparatus ~~(40; 60; 80; 90)~~ comprising a main input ~~(50; 70; 79; 92)~~ for receiving said input signal ~~(S.sub.RF (t))~~, a first mixer ~~(41; 61)~~ having a first mixer input ~~(44; 64)~~, a first local oscillator input ~~(47; 67)~~, and a first mixer output ~~(A)~~, the first mixer input ~~(44; 64)~~ being connectable to the main input ~~(50; 70; 79; 92)~~ and the first local oscillator input ~~(47; 67)~~ being connectable to a source ~~(86, 87; 93)~~ providing a first local oscillator signal ~~(LO1)~~ having a frequency ~~(.omega..sub.LO)~~ close to or equal to the carrier frequency ~~(.omega..sub.RF)~~, the first mixer ~~(41; 61)~~ performing a multiplication of said input signal ~~(S.sub.RF (t))~~ and said first local oscillator signal ~~(LO1)~~ to provide a first output signal ~~(S.sub.A (t))~~ at the, first mixer output ~~(A)~~, the apparatus ~~(40; 60; 80; 90) being characterized in that it~~ further compris~~es~~ings at least a second mixer ~~(42; 62)~~ having a second mixer input ~~(45; 65)~~, a second local oscillator input ~~(48; 68)~~, and a second mixer output ~~(B)~~, the second mixer input ~~(45; 65)~~ being connectable to the main input ~~(50; 70; 79; 92)~~ and the second local oscillator input ~~(48; 68)~~ being connectable to a source ~~(86, 87; 94)~~ providing a second local oscillator signal ~~(LO2)~~ having the sideband frequency ~~(n.omega..sub.LO)~~, the second mixer ~~(42; 62)~~ performing a multiplication of said input signal ~~(S.sub.RF (t))~~ and said second local oscillator signal ~~(LO2)~~ to provide a second output signal ~~(S.sub.B (t))~~ at the second mixer output ~~(B)~~, means for performing a superpositioning of the first output signal ~~(S.sub.A (t))~~ and the second output signal whereby an undesired component of the first output signal is partially or wholly cancelled~~(S.sub.B (t))~~, the first local oscillator signal ~~(LO1)~~ and the second local oscillator signal ~~(LO2)~~ being square wave signals.

2. (Currently amended) Apparatus ~~(40; 60; 80; 90)~~ as claimed in claim 1, wherein the second mixer ~~(42; 62)~~ applies a negative or a positive coefficient ~~(1/3; -1/3; 1/n; -1/n)~~ when performing the multiplication of said input signal ~~(S.sub.RF (t))~~ and said second local oscillator signal ~~(LO2)~~.

3. (Currently amended) Apparatus ~~(40; 60; 80; 90)~~ as claimed in claim 1~~-or 2~~, wherein the means for performing a superpositioning of the first output signal and the second output signal ~~(S.sub.B (t))~~ are realized as an adder~~-(51; 71)~~.

4. (Currently amended) Apparatus ~~(40; 60; 80; 90)~~ as claimed in claim 1,~~-2 or 3,~~ wherein the desired band carries an information signal, preferably digital data, modulated on the carrier signal with the carrier frequency~~-(.omega..sub.RF)~~.

5. (Currently amended) Apparatus ~~(40; 60; 80; 90)~~ as claimed in one of the preceding claims, wherein the side band frequency ~~(n.omega..sub.LO)~~ is an odd harmonic of the carrier frequency~~-(.omega..sub.RF)~~.

6. (Currently amended) Apparatus ~~(40; 60; 80; 90)~~ as claimed in ~~one of the preceding claims~~claim 1, further comprising a low-pass filter ~~(LPF; 52; 72; 85)~~ at the output side of the apparatus~~-(40; 60; 80; 90)~~.

7. (Currently amended) Apparatus ~~(40; 60; 80; 90)~~ as claimed in ~~one of the preceding claims~~claim 1, wherein, in order to avoid direct feedthrough, the output of the apparatus ~~(40; 60; 80; 90)~~ is sensed as a differential signal.

8. (Currently amended) Apparatus ~~(40; 60; 80; 90)~~ as claimed in ~~one of the preceding claims~~claim 1, wherein the period (T1) of the first local oscillator signal ~~(LO1)~~ and the period (T2) of the second local oscillator signal ~~(LO2)~~ have the following relationship: T2 =T1/3.

9. (Currently amended) Apparatus ~~(40; 60; 80; 90)~~ as claimed in ~~one of the preceding claims~~claim 1, wherein the first local oscillator signal ~~(LO1)~~ and the second local oscillator signal ~~(LO2)~~ have zero phase at t=0.

10. (Currently amended) Apparatus ~~(60; 80; 90)~~ as claimed in ~~one of the~~ claims 1~~-through~~

~~8~~, wherein the first local oscillator signal ~~(LO1)~~ and the second local oscillator signal ~~(LO2)~~ have quadrature phases.

11. (Currently amended) Apparatus ~~(40; 60; 80; 90)~~ as claimed in ~~one of the preceding claims~~claim 1, wherein the square waves have a 50% duty cycle.

12. (Currently amended) Method of processing an input signal ~~(S.sub.RF (t))~~ having a carrier frequency ~~(.omega..sub.RF)~~ defining a desired band and at least one sideband frequency ~~(n.omega..sub.LO)~~ defining a sideband, where the sideband frequency ~~(n.omega..sub.LO)~~ is higher than the carrier frequency ~~(.omega..sub.RF)~~, the method comprising the steps of: receiving said input signal ~~(S.sub.RF (t))~~, providing a first local oscillator signal ~~(LO1)~~ having a frequency ~~(.omega..sub.LO)~~ close to or equal to the carrier frequency ~~(.omega..sub.RF)~~, performing a multiplication of said input signal ~~(S.sub.RF (t))~~ with said first local oscillator signal ~~(LO1)~~ in order to provide a first output signal ~~(S.sub.A (t))~~, providing a second local oscillator signal ~~(LO2)~~ with the sideband frequency ~~(n.omega..sub.LO)~~ performing a multiplication of said input signal ~~(S.sub.RF (t))~~ and said second local oscillator signal ~~(LO2)~~ in order to provide a second output signal ~~(S.sub.B (t))~~, performing a superpositioning of the first output signal ~~(S.sub.A (t))~~ and the second output signal whereby an undesired component of the first output signal is partially or wholly cancelled ~~(S.sub.B (t))~~, wherein the first local oscillator signal ~~(LO1)~~ and the second local oscillator signal ~~(LO2)~~ are square-wave signals.

13. (Currently amended) Method as claimed in claim 12, wherein a negative or a positive coefficient ~~(1/3; -1/3; 1/n; -1/n)~~ is applied when performing the multiplication of said input signal ~~(S.sub.RF (t))~~ and said second local oscillator signal ~~(LO2)~~.

14. (Currently amended) Method as claimed in claim 12 ~~or 13~~, wherein the superpositioning is performed by means of an adder ~~(51; 71)~~.

15. (Currently amended) Method as claimed in claim 12, ~~13 or 14,~~ wherein the desired band carries an information signal, preferably digital data, modulated on the carrier signal

with the carrier frequency ~~(.omega..sub.RF)~~.

16. (Currently amended) Method as claimed in ~~one of the claims 12 through 15~~claim 12, wherein the sideband frequency ~~(n.omega..sub.LO)~~ is an odd harmonic of the carrier frequency ~~(.omega..sub.RF)~~.

17. (Currently amended) Method as claimed in ~~one of the claims 12 through 16~~claim 12, using a low-pass filter ~~(LPF; 52; 72; 85)~~ at the output side.

18. (Currently amended) Method as claimed in ~~one of the claims 12 through 17~~claim 12, wherein the output is sensed as a differential signal.

19. (Currently amended) Method of ~~one of the claims 12 through 18~~claim 12, wherein the period (T1) of the first local oscillator signal ~~(LO1)~~ and the period (T2) of the second local oscillator signal ~~(LO2)~~ have the following relationship: T2 =T1/3.

20. (Currently amended) Method as claimed in ~~one of the claims 12 through 19~~claim 12, wherein the first local oscillator signal ~~(LO1)~~ and the second local oscillator signal ~~(LO2)~~ have zero phase at t=0.

21. (Currently amended) Method as claimed in ~~one of the claims 12 through 19~~claim 12, wherein the first local oscillator signal ~~(LO1)~~ and the second local oscillator signal ~~(LO2)~~ have quadrature phases.

22. (Currently amended) Method as claimed in ~~one of the claims 12 through 21~~claim 12, wherein the square waves have a 50% duty cycle.

23. (Currently amended) Receiver, preferably a heterodyne radio frequency receiver, comprising an apparatus ~~(40; 60; 80; 90)~~ according to ~~one of the~~ claims 1~~through 11~~, said apparatus ~~(40; 60; 80; 90)~~ being part of a chain of circuits ~~(82, 83, 85, 89)~~ that processes the input signal ~~(S.sub.RF(t))~~ to convert it to a low-frequency intermediate-

frequency signal ~~(S.sub.IF(t))~~.

24. (Currently amended) Receiver as claimed in claim 23, being part of a Global System for Mobile communication (GSM) system, a Blue tooth system, or a Universal Mobile Telephony System.